02-07-00

A

ATTORNEY DOCKET NO.
065113.0146

PATENT APPLICATION

APPLICATION FOR U.S. PATENT UNDER 37 C.F.R. § 1.53(b)
TRANSMITTAL FORM

Box Patent Application
ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of:

Inventor or Application Identifier: Mark E. Holzbach, et al.

Entitled: DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL

Enclosed are: _X_ Specification (24 pages)
_X_ Drawing(s) (2 Sheets Informal)

_X_ Unsigned combined Declaration and Power of Attorney.

___ Information Disclosure Statement (IDS) PTO-1449 with copies of references cited.

_X_ Certificate of Mailing

_X_ Return Receipt Postcard

____ An Assignment of the invention to Zebra Imaging, Inc. is attached. A cover sheet in compliance with 37 C.F.R. §§ 3.28 and 3.31 is included with the Assignment recordation fee of $40.00 pursuant to 37 C.F.R. § 1.21(h).

___ The accompanying application claims the benefit of U.S. provisional patent application Serial No. _____ filed _____.

PATENT APPLICATION

Applicant is Small Entity.

FEE CALCULATION					FEE
	Number		Number Extra	Rate	Basic Fee $ 345.00
Total Claims:	31	-20 =	11	X $ 9 =	$ 99.00
Independent Claims	2	- 3 =	0	X $39 =	$ 0.00
				TOTAL FILING FEE =	$ 444.00

Enclosed is a check in the amount of $444.00 to satisfy filing fee requirements under 37 C.F.R. § 1.16. Please charge any additional fees or credit any overpayment to Deposit Account No. 02-0384 of Baker Botts L.L.P. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

BAKER BOTTS L.L.P.
Attorneys for Applicants

Ann C. Livingston
Reg. No. 32,479

Date: February 4, 2000

Correspondence Address:
Ann C. Livingston
Baker Botts L.L.P.
2001 Ross Avenue
Dallas, Texas 75201-2980
Tel. (512) 322-2634
Fax. (512) 322-2501

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Mark E. Holzbach, et al.

Date Filed: February 4, 2000

Title: DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL

Box Patent Application
Honorable Assistant Commissioner
of Patents
Washington, D.C. 20231

Dear Sir:

CERTIFICATE OF MAILING BY EXPRESS MAIL

I hereby certify that the attached Transmittal, Patent Application, Verified Statement Claiming Small Entity Status, Declaration and Power of Attorney (unsigned), and Informal Drawings are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on this 4th day of February, 2000. and is addressed to the Assistant Commissioner of Patents, Washington, D.C. 20231.

AStandish

Allison Standish

Express Mail Receipt
No. EL519494377US
Attorney's Docket:
065113.0146

Filed or Issued: Herewith Attorney's Docket: 065113.0146

Title: DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c)) – SMALL BUSINESS CONCERN

I hereby declare that I am an official of the small business concern empowered to act on behalf of the concern identified below:

Name of Small Business Concern: Zebra Imaging, Inc.
Address of Small Business Concern: 1406 Three Points Road
Pflugerville, Texas 78660

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL by inventors Mark E. Holzbach, Michael A. Klug and Alejandro José Ferdman described in the specification filed herewith.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e):

NONE

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or my maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Name of Person Signing: Mark E. Holzbach
Title of Person if other than owner: Vice President
Address of Person Signing: Zebra Imaging, Inc.
1406 Three Points Road
Pflugerville, Texas 78660

Signature: Mark Holzbach

Date: 4 Feb 2000

DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL

TECHNICAL FIELD

This invention relates to holography, and more particularly to a distributed system for producing holographic stereograms, oriented to customer accessibility and to acceptance of a wide variety of customer-produced source material.

BACKGROUND

A holographic stereogram is a type of hologram, characterized by having been made from a series of views, which are multiplexed into a single hologram. For a hologram having only horizontal parallax, a series of vertical strips is exposed. For a full parallax hologram, exposures in two orthogonal directions are used.

More specifically, the source data for holographic stereograms is a sequence of two-dimensional (2D) views. As compared to a "true" hologram, a physical object is not directly exposed. An example of a series of 2D views is a series of views taken with a motion controlled camera. Another example is a series of views generated by computer graphics software. The views may represent a scene that is still, or they may be continuous views of a scene in motion. However, there is no requirement that the views be all related to one scene.

Once the sequence of views is obtained, they are displayed using a spatial light modulator, such as film or a liquid crystal display. Appropriate optical processing is performed, and an object beam and a reference beam are used to expose holographic film. The result is a series of small component holograms which together form an integrated holographic image. Although the source material is two-dimensional, the viewer may perceive the holographic image to be three-dimensional.

Equipment for producing holograms tends to be expensive, complex, and large, and to require skilled

operators. Hologram production has tended to be a labor intensive and time consuming process, with long lead times and limited opportunity for customization to the liking of an individual purchaser.

SUMMARY OF THE INVENTION

One aspect of the invention is a system for producing holographic stereograms (holograms) on-demand by an individual customer, from source material provided by the customer. The system has at least one data acquisition station accessible to the customer. Typically, this station is remote from other equipment used for the hologram production, such as equipment for image processing and printing.

The data acquisition station may be the customer's own personal computer, such as for an e-commerce type of hologram production system, or it may be a brick and mortar site. Each data acquisition station has a data acquisition processor that receives image data based on the source material and a customer-based preview processor that displays a representation of the hologram for viewing by the customer.

The image processing station has an image processor operable to process image data received from the data acquisition station. It typically also has a preview processor, which is designed for use by the operator rather than by a customer. The printing station has a spatial light modulator for receiving data from the image processor and for displaying holographic component images, and also has a printer for producing a master holographic stereogram. The system may also include a replicating station for replicating holograms from a master hologram.

When the data acquisition station is remote from the image processing station, various types of communication links can be used between them. An advantage of the invention is that it is amenable to Internet type communications. The processing tasks executed at the data acquisition station can be downloaded from a remote server. Alternatively, the image data can be uploaded to a server, which then prepares preview images and downloads them for viewing by the customer at the data acquisition station.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 illustrates a distributed system for producing holographic stereograms in accordance with the invention.

FIGURE 2 illustrates a modification of the system of FIGURE 1, especially suited for Internet ordering by customers.

DETAILED DESCRIPTION OF THE INVENTION

FIGURE 1 is a block diagram of the basic elements of a system 10 for producing holographic stereograms in accordance with the invention. As described in the Background, holographic stereograms are characterized by having been made from data representing a sequence of two-dimensional (2D) images. For purposes of this description, holographic stereograms are referred to as "holograms", although there are other types of holograms.

As explained below, system 10 is used to produce holograms "on demand" for individual customers, from a wide variety of source material. System 10 is "on demand" in the sense that a customer may visit a local facility, order a hologram that is specific to the customer's source material and preferences, and receive a hologram responding to those specifications.

System 10 is geographically distributed among various sites. It has multiple sites for collecting image data from customers, as well as sites for processing the image data and for printing and replicating holograms.

In the embodiment of FIGURE 1, each of four sites is assumed to be geographically remote from the other sites. Data is communicated electronically from one facility to another. A suitable communication means is the Internet. However, other data communication systems could be used.

In other embodiments, some sites may be co-located. For example, all image processing, printing, and replicating (shown in FIGURE 1 at Sites 2, 3, and 4)

could occur at a single site. However, a feature of the invention is distribution of the data acquisition sites (Site 1), and in FIGURE 1 it is assumed that at least those sites are geographically remote from the other sites.

System 10 includes various "processors". These processors may be implemented with conventional computing equipment, including one or more microprocessors, memory, and input and output devices. The programming for each processor, stored in memory of that processor, is described below. The use of the term "processor" in no way limits the implementation to dedicated equipment; the processor may be implemented on general purpose equipment that performs other unrelated processes.

To obtain a hologram, the customer visits a data acquisition site (Site 1), at a location such as a shopping mall, entertainment center, or document preparation center. Another example might be a driver's license center, where system 10 is used to generate a hologram of the license recipient on each license.

Data acquisition site (Site 1) is equipped with a digitizer 11a. By "digitizer" is meant any equipment that photographs or scans two- or three-dimensional subject material and generates image or three-dimensional (3D) model data. Examples of subject material are 3D objects, printed material, and movie film. The appropriate type of digitizer depends on the subject matter, but may be a still camera, video camera, 2D scanner, or 3D scanner.

Alternatively, the customer may provide source material that is already digital, such as in the case of digital videotape, digital photographs, or graphics data files.

It should be understood that the data acquisition site (Site 1) could be the customer's own personal computer. In this case, the processor elements of the site could be installed as software by the customer or downloaded from an Internet site maintained by the hologram producer. The customer may establish a data connection to the data acquisition site, such as by means of the Internet from the customer's personal computer. Using this data link, the customer might send any form of digital image data, such as a video stream or graphics file.

FIGURE 2 illustrates an "e-commerce" type system 20, which is a modification of the system of FIGURE 1. In system 20, the data acquisition sites are personal computers 21. In the example of FIGURE 2, equipment for all other tasks involved in the hologram production (those of Site 2, Site 3, and Site 4 of FIGURE 1) are co-located at a single production site 22. However, these sites may be remote from each other and connected with appropriate data communication links.

For the system 20 of FIGURE 2, each customer may order a hologram via a communications link, such as the Internet. The customer accesses a server 23, from which appropriate software for delivering image data and previewing holograms may be downloaded to the customer,

thereby implementing the data acquisition processor and the preview processor on the customer's computer 21. Alternatively, the customer may send image data to server 23, which performs the processing tasks for the customer-based preview and returns preview images to the customer's computer 21. A graphics database 24 may be used to store graphics data, which may be selected and downloaded to the customer's computer 21. The processing tasks implemented on the customer's computer 21 and the server 22 may include data compression processing to minimize data transmission time and data storage demands.

Referring again to FIGURE 1, system 10 is designed to produce holograms from many different types of source material. One type of source material is real objects, which may be inanimate objects, animals, or people. The customer provides the object, whose digital image is captured, still or in motion. The source material may be a sequence of images recorded on a pre-existing medium such as videotape or movie film. The source material may be one or more printed images, such as photographs or printed pages, to make a hologram of a sequence of these photographs or pages.

The source material may also be image data, such as that generated by graphics generating software. An example of suitable graphics data is 3D polygon-based data and associated scene description information such as colors, lighting, and textures. Other types of graphics data, such as NURB surfaces, volumetric data, point-cloud data, and particle system data may be used. The

following formats are examples of suitable formats: dxf, obj, iges, tri, 3ds, max, slp, and iv.

Regardless of the type of source material, data acquisition process 11b receives image data for transmission to an image processing site (Site 2). Appropriate types of computer-generated graphics data formats may be "directly rendered" and may be transmitted without further processing. Other image data is assembled into a sequence of 2D images, having a specified number of image frames. The images may or may not represent motion, and they may or may not represent perspective views. However, a feature of the invention is the ability to provide "four dimensional" holograms having a scene with both motion and a range of perspectives.

Another feature of the invention is the capability to composite data from different types of source material. To this end, compositing processor 11e accepts image data and merges it into a desired scene. As explained below, the composited data may include image data from a pre-stored graphics database.

Preview processor 11c executes an interactive process that generates and displays a simulated representation of the hologram. It permits the user to visualize the hologram before it is printed and to make various design selections. Pre-view processor 11c is "customer-based" in that it presents the customer with a display of the simulated hologram, presents design choices to the customer, and receives input regarding

design selections from the customer. As such, its graphical user interface is designed to facilitate use by customers having little knowledge about holography.

In one embodiment, the preview could be of the sequence of images collected by acquisition processor 11b. The preview permits selection of a number of frames to be actually used to produce the hologram. The customer might then be permitted to reject the sequence entirely and re-do the digitization. Or, the customer might select a particular sequence of frames from a larger sequence. Simple designs will comprise a continuous sequence of frames, but the customer might also choose alternating frames or leave a gap in frames, such as to result in a desired motion effect. The user might be permitted to select frames in terms of a beginning frame and a time period, or by identifying particular frames up to a certain number of frames.

Additional design parameters may be selected and pre-visualized by the customer, using preview process 11c. Design choices, such as lighting and framing, can be selected, displayed, and modified. Other design choices might include contrast or color variations. The interface of preview processor 11c presents these design choices to the customer and accepts and processes the customer's selections.

In other embodiments of preview processor 11c, in addition to or alternatively to a sequence of frames, preview processor 11c might present an image of the hologram as it will actually appear when printed.

Effects such as blurring of features far into the foreground or background could be represented, so that the user might have the option of changing the plane of the hologram relative to the subject material. In more sophisticated embodiments, the simulated hologram might be rotatable so that the customer could perceive how it would appear from different viewing angles. Preview processor 11c permits the user to make decisions such as how the hologram is to be bounded or re-sized, accepts associated design selections, and redisplays the simulated hologram.

A graphics imagery database 11d stores graphics imagery, which can be added to the background or foreground. For example, database 11d might store text to be added. Or, as another example, a person's photographically acquired image might be placed in an imaginative locale. As explained above, compositing processor 11e performs any compositing tasks.

At an image data processing site (Site 2), image data processor 12a receives data from the data acquisition site (Site 1). As indicated above, this data may be 2D sequential data or 3D computer graphics data, depending on the source material provided by the customer. Examples of a suitable platforms for image data processor 12a are workstations operating with the UNIX or UNIX variations operating systems, Windows operating systems, or Macintosh operating systems.

The processing performed by image data processor 12a may vary depending on the type of data received from the

data acquisition site. For example, where the hologram is to be printed entirely from computer graphics input data, the processing may be accomplished with double frustrum rendering or light field rendering.

In the case of 2D sequence data, image data processor 12a executes a "slice and dice" process (also referred to as block transform), which begins with a series of n frames having h x v pixels each. For horizontal parallax, a new series of h number of frames is created, each having n slices (one slice from each column of the original sequence of frames). For example, a 2D sequence might comprise 400 frames, each having 640 columns x 480 rows of pixels. From this sequence, a new sequence of 640 images would be generated, each having 400 hogels (holographic columns), each being one pixel column of each source image, in the same sequence as the source images. For full parallax, the slice and dice process would be performed in both directions, resulting in a set of 640 x 480 images, each having 400 x 400 square hogels.

As indicated in FIGURE 1, the image processing site may receive image data from multiple data acquisition sites. Images from one or more sites can be combined. For example, different family members might send images from different data acquisition sites to create a group family portrait. Thus, image data processor 12a is also operable to composite image data.

Graphics data may also be processed in the same manner as image sequences, rather than being double

frustrum rendered. For example, the source material might be both a camera-acquired portrait and images from a computer graphics file, which are to be combined to make the hologram. The compositing may be accomplished by rendering the computer graphics file in a manner that simulates the camera that acquired the portrait, then adding that data to the portrait data.

Image processor 12a may also perform other processing, such as view zone assembly and scaling. The output of image processor 12a is referred to herein as "hogel data", which is to be displayed using some sort of spatial light modulation during the printing process.

In the system of FIGURE 1, the image processing performed by processor 12a is "off line" in the sense that data for an entire hologram is prepared and stored for delivery to the SLM 13a at the printing site (Site 3). In other embodiments, processor 12a could be "on line", meaning that data for each SLM image is prepared and delivered to the SLM while the next image is being prepared. Or a hybrid system could be used, where some processing is "off line" and "on line".

Image processing site (Site 2) has a preview processor 12b, which is operator-oriented. That is, preview processor 12b is designed for use by one skilled in the production of holographic stereograms. Preview processor 12b is interactive, displays a representation of the hologram, and is used to help design the hologram. Preview processor 12b may display a sequence of frames received from data acquisition site. Like preview

processor 11c, preview processor 12b might also display a representation of the hologram as it would be printed. Various parameters may affect the design of the hologram, such as the boundaries of the image, its sizing, and the distance from which the hologram is to be viewed. Preview processor 12b permits the operator to modify and view changes to these parameters.

At a printing site (Site 3) SLM 13a receives the hogel data from image processor 12a. SLM 13a generates an image for each holographic element (hogel) to be exposed by printer 13b on a holographic medium. The image generated by SLM 13a is referred to herein as the "holographic object image". For horizontal parallax, each hogel is a thin strip. For full parallax, each hogel is a small rectangle (or some other geometric shape) in an 2D array of hogels. In the example of this description, SLM 13a is assumed to be a liquid crystal display.

Printer 13b exposes the holographic medium with a reference beam and object beam reflected from SLM 13a. In the embodiment of FIGURE 1, printer 13b is a one-step printer system, meaning that only one exposure is required for each hogel being printed. However, the concepts described herein are also applicable to other printing systems. Various optical mechanisms are used to focus the SLM image on the holographic film. The optics vary depending on whether the hologram is to be full parallax or horizontal parallax-only. For full parallax

light is focused to approximately a point; for horizontal parallax-only, light is focused as approximately a line.

The result of the printing process is a master hologram. In some embodiments of the invention, the master itself may be provided to the customer. In this case, any framing, lighting, and other finishing could occur at the printing site (Site 3).

Examples of suitable printers are described in U.S. Patent Serial No. 09/195,137 entitled "Apparatus and Method for Replicating a Hologram Using a Steerable Beam", assigned to Zebra Imaging Incorporated and incorporated herein by reference. These printers implement a one-step process for producing reflection holograms. The patent also describes various processing steps performed by image processor 12a.

A special process for producing edge-lit holograms is described in U.S. Patent Serial No. 60/120,433 entitled "System and Method for Producing and Displaying a One-Step Edge-Lit Hologram", assigned to Zebra Imaging Incorporated, and incorporated herein by reference.

Replication site (Site 4) is used when holograms are to be replicated from a master hologram. It receives the master hologram from the printing site and replicates the hologram, such as by means of a contact copy process. Various finishing procedures may also occur here, such as for framing and illumination.

Other Embodiments

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A system for producing holographic stereograms (holograms) on-demand by an individual customer, from source material provided by the customer, comprising:

at least one data acquisition station, each having a data acquisition processor that receives image data based on the source material and a customer-based preview processor that displays a representation of the hologram for viewing by the customer;

an image processing station, each having an image processor operable to generate hogel data based on image data received from the data acquisition station; and

a printing station having a spatial light modulator for receiving the hogel data from the image processor and for displaying holographic object images, and having a printer for producing a master holographic stereogram;

wherein the data acquisition station is in data communication with the image processing station and the printing station.

2. The system of Claim 1, wherein the data acquisition station is remote from the image processing station and the printing station.

3. The system of Claim 1, wherein the image processing station also has an operator-based preview processor operable to display a representation of the hologram for viewing by an operator of the image processor.

4. The system of Claim 1, wherein the data acquisition station is a personal computer.

5. The system of Claim 4, wherein the data communication is accomplished via the Internet.

6. The system of Claim 4, wherein the data acquisition processor and the customer-based preview processor execute with programming downloaded to the personal computer.

7. The system of Claim 4, wherein the customer-based preview processor displays preview images generated at a remote server.

8. The system of Claim 1, wherein the data acquisition processor receives at least input from a video source.

9. The system of Claim 1, wherein the data acquisition processor receives at least input from two dimensional printed material.

10. The system of Claim 1, wherein the data acquisition station further has a compositing processor for combining image data from different source material.

11. The system of Claim 1, wherein the data acquisition station further has a graphics database for storing image data to be added to image data provided by a customer.

12. The system of Claim 1, wherein the data acquisition station further has a digitizer for providing image data from source material provided by a customer.

13. The system of Claim 1, further comprising a replicating station for producing hologram copies from the master hologram.

14. The system of Claim 1, wherein the image processing station and printing station are geographically remote and in data communication.

15. The system of Claim 1, wherein the data acquisition processor delivers 2D sequence data to the image processor.

16. The system of Claim 1, wherein the data acquisition processor delivers computer generated 3D graphics data to the image processor.

17. A method for producing holographic stereograms (holograms) on-demand for an individual customer, from customer-provided source material, comprising the steps of:

acquiring image data at a data acquisition station having a data acquisition processor that receives image data based on the source material and a customer-based preview processor that displays a representation of the hologram for viewing by the customer;

delivering the image data to an image processing station having an image processor operable to generate hogel data based on image data received from the data acquisition station; and

delivering the hogel data to a printing station having a spatial light modulator for receiving the hogel data from the image processor and for displaying holographic object images, and having a printer for producing a master holographic stereogram.

18. The method of Claim 17, wherein the data acquisition station is remote from the image processing station and the printing station.

19. The method of Claim 17, wherein the image processing station also has an operator-based preview processor operable to display a representation of the hologram for viewing by an operator of the image processor.

20. The method of Claim 17, wherein the data acquisition station is a personal computer.

21. The method of Claim 20, wherein the data communication is accomplished via the Internet.

22. The method of Claim 20, wherein the data acquisition processor and the customer-based preview processor execute with programming downloaded to the personal computer.

23. The method of Claim 20, wherein the customer-based preview processor displays preview images downloaded from a server.

24. The method of Claim 17, wherein the data acquisition processor receives at least input from a video source.

25. The method of Claim 17, wherein the data acquisition processor receives at least input from two dimensional printed material.

26. The method of Claim 17, further comprising the step of compositing image data from different source material.

27. The method of Claim 26, wherein the compositing occurs at the data acquisition station.

28. The method of Claim 26, wherein the compositing occurs at a server site, such that the pre-view processor displays composited preview images downloaded from the server site.

29. The method of Claim 17, wherein the image processing station and printing station are geographically remote and in data communication.

30. The method of Claim 17, wherein the data acquisition processor delivers 2D sequence data to the image processor.

31. The method of Claim 17, wherein the data acquisition processor delivers computer generated 3D graphics data to the image processor.

DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL

ABSTRACT OF THE DISCLOSURE

A distributed system for producing holographic stereograms (holograms). A data acquisition station is typically remote from image processing, printing, and replicating stations. The data acquisition station is designed to maximize customer convenience, and may be the customer's own personal computer. The data acquisition station is further designed to accept a wide variety of source data and to perform whatever processing is required to deliver image data to the image processing station in an acceptable format. The data acquisition station further has processing capability to display preview images, which may be assembled by programming executing at the data acquisition station or downloaded from a server.

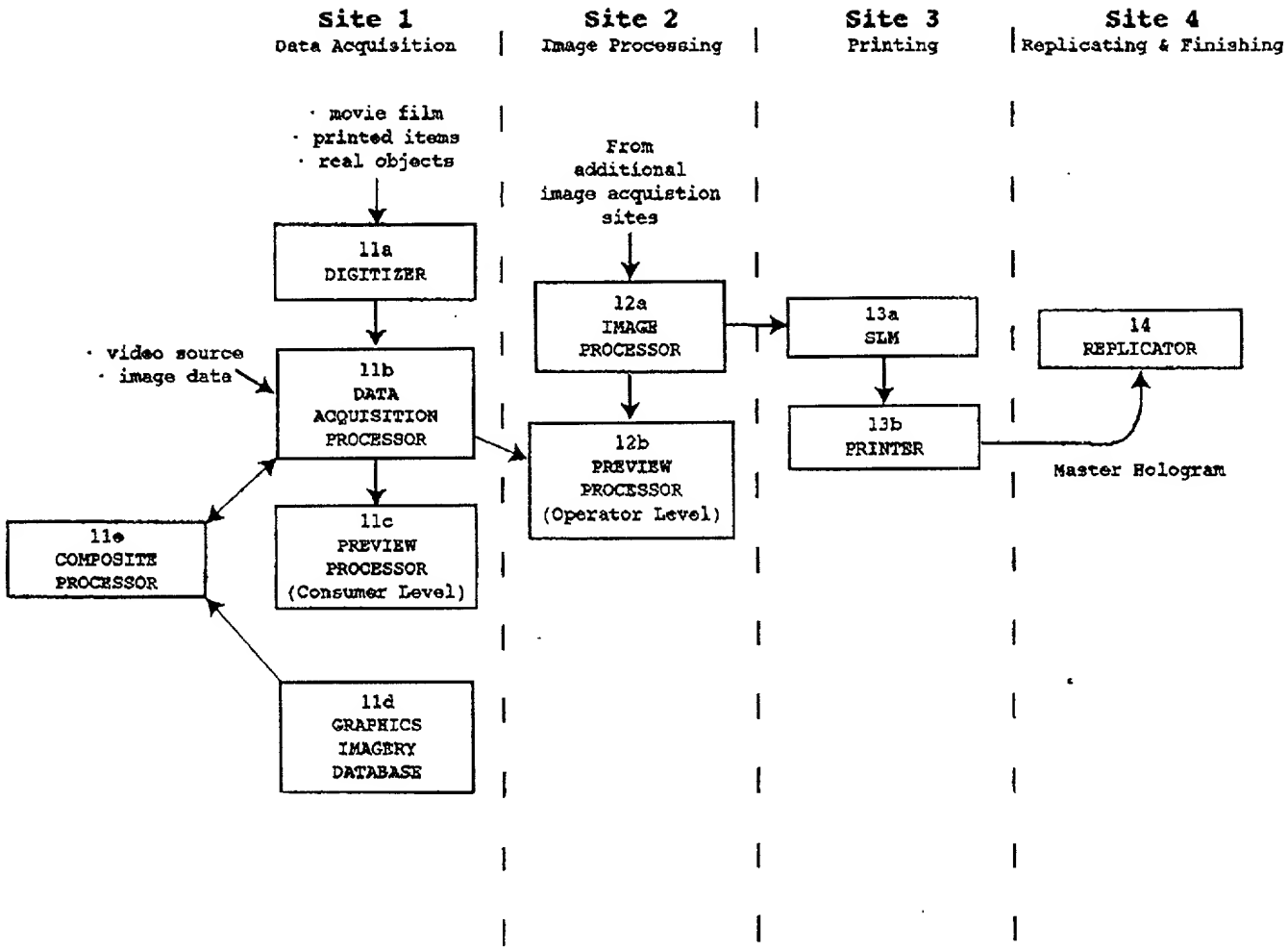
Site 1
Data Acquisition
Site 2
Image Processing
Site 3
Printing
Site 4
Replicating & Finishing
· movie film
· printed items
· real objects
From additional image acquistion sites
11a DIGITIZER
12a IMAGE PROCESSOR
13a SLM
14 REPLICATOR
· video source
· image data
11b DATA ACQUISITION PROCESSOR
12b PREVIEW PROCESSOR (Operator Level)
13b PRINTER
Master Hologram
11e COMPOSITE PROCESSOR
11c PREVIEW PROCESSOR (Consumer Level)
11d GRAPHICS IMAGERY DATABASE
10

Figure 1.

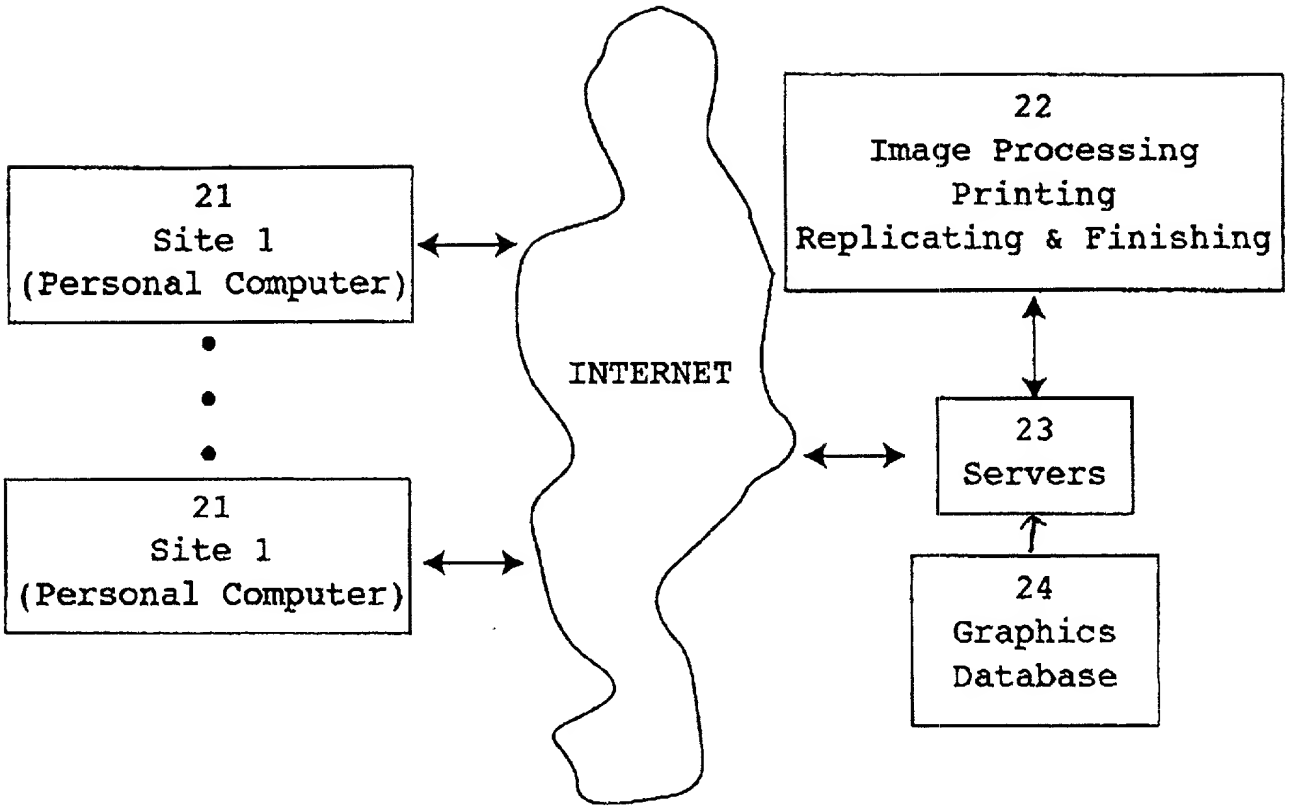
21
Site 1
(Personal Computer)
21
Site 1
(Personal Computer)
INTERNET
22
Image Processing
Printing
Replicating & Finishing
23
Servers
24
Graphics
Database
20

Figure 2.

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; that I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention or design entitled DISTRIBUTED SYSTEM FOR PRODUCING HOLOGRAPHIC STEREOGRAMS ON-DEMAND FROM VARIOUS TYPES OF SOURCE MATERIAL, the specification of which (check one):

__X__ is attached hereto; or

_____ was filed on _____ as

Application Serial No. _____ and

was amended on _____ (if applicable);

that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and that I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Number	Country	Date Filed	Priority Claimed
None.			(Yes) (No)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Serial Number	Date Filed	Status

I hereby appoint:

Jerry W. Mills	Reg. No. 23,005
Robert M. Chiaviello, Jr.	Reg. No. 32,461
Ann C. Livingston	Reg. No. 32,479
Thomas R. Felger	Reg. No. 28,842
Charles S. Fish	Reg. No. 35,870
Wei Wei Jeang	Reg. No. 33,305
Kevin J. Meek	Reg. No. 33,738
T. Murray Smith	Reg. No. 30,222
Barton E. Showalter	Reg. No. 38,302
David G. Wille	Reg. No. 38,363
Bradley P. Williams	Reg. No. 40,227
Terry J. Stalford	Reg. No. 39,522
Christopher W. Kennerly	Reg. No. 40,675
Harold E. Meier	Reg. No. 22,428
Douglas M. Kubehl	Reg. No. 41,915
Samir A. Bhavsar	Reg. No. 41,617
Thomas R. Nesbitt, Jr.	Reg. No. 22,075
James J. Maune	Reg. No. 26,946
Roger J. Fulghum	Reg. No. 39,678
Rodger L. Tate	Reg. No. 27,399
Scott F. Partridge	Reg. No. 28,142
James B. Arpin	Reg. No. 33,470

James Remenick	Reg. No. 36,902
Jay B. Johnson	Reg. No. 38,193
Robert W. Holland	Reg. No. 40,020
Floyd B. Chapman	Reg. No. 40,555
Robert A. King	Reg. No. 42,738
James L. Baudino	Reg. No. 43,486
Scott T. Morris	Reg. No. 43,818
Tara D. Knapp	Reg. No. 43,723
William R. Borchers	Reg. No. 44,549
Robin A. Brooks	Reg. No. 44,563
Darren W. Collins	Reg. No. 44,625
Brian W. Oaks	Reg. No. 44,981
Luke K. Pedersen	Reg. No. 45,003
Matthew B. Talpis	Reg. No. 45,152
David M. Doyle	Reg. No. 43,596
Keiko Ichiye	Reg. No. P45,460
Russell W. White	Reg. No. P45,691
Patent Agents:	
Brian A. Dietzel	Reg. No. 44,656
Kevin R. Imes	Reg. No. 44,795

all of the firm of Baker Botts L.L.P., my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities.

Send Correspondence To:	Direct Telephone Calls To:
Baker Botts L.L.P.	Ann C. Livingston
2001 Ross Avenue	at 512.322.2634
Dallas, Texas 75201-2980	Atty. Docket No.065113.0146

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the

United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of the first inventor	Mark E. Holzbach
Inventor's signature	_____
Date	_____
Residence (City, County, State)	Austin, Travis County, Texas
Citizenship	United States of America
Post Office Address:	706-D West Avenue Austin, Texas 78701

Full name of the second inventor	Michael Anthony Klug
Inventor's signature	_____
Date	_____
Residence (City, County, State)	Austin, Travis County, Texas
Citizenship	United States of America
Post Office Address:	4200 Farhills Drive Austin, Texas 78731

Full name of the third inventor	Alejandro José Ferdman
Inventor's signature	_____
Date	_____
Residence (City, County, State)	Austin, Travis County, Texas
Citizenship	United States of America
Post Office Address:	6107 Sierra Arbor Court Austin, Texas 78759